A NEW GENUS OF SHORT-BEAKED GNATS FROM CEYLON.

By N. Annandale, D.Sc., F.A.S.B., Indian Museum.

(With one Plate and one Text-figure.)

THROUGH the kind offices of Mr. E. E. Green I have been entrusted with the examination of microscopic preparations of the larva, pupa, and imago of a peculiar little gnat taken by Major MacDougall, R.A.M.C., in a swamp at Diyatalawa in Ceylon (alt. *ca.* 4,300 feet). The specimens are mounted in Canada balsam, and unfortunately include only one imago, a male; but the structure of the fly and its immature stages is of such interest from a systematic point of view that I have ventured to describe the genus and species as new. In so doing I have, I may say, found it very much easier to give a description of the structure than if the specimen had been mounted dry in the ordinary way.

It is a point worth considering whether more fixed and definite standards of entomological classification might not be reached if dried specimens were to be treated as of less account than those carefully mounted in some liquid medium, which would prevent their more delicate organs from becoming shrivelled out of all recognition. Colour would, in some cases, have to go, but, if the preservation be properly carried out, there is no reason why even the finest scales or hairs should be lost in specimens kept in spirit or Canada balsam.

The main interest of the new genus here described as *Ramcia* lies in the fact that it affords a complete link between the "Culicidæ" of Theobald* and other recent authors, and the genera which these authors, intent on finding new pretexts for rending asunder what Nature has joined together, would separate as the family "Corethridæ." In this particular instance the excuse for dividing families resides partly in the structure of the larva and partly in the short proboscis of the imago and the absence of scales on the head, body, legs, and veins of the wings. The larvæ of different "Corethridæ," however, differ considerably more one from another than certain of them do from those of the "Culicidæ"; there is far more difference in structure, to take parallel instances, between the proboscis of *Stomoxys* or even *Philæmatomyia* and that of *Musca* than there is between that of *Culex* and that of *Corethra*, although even the most recent writers place *Stomoxys* and *Philæmatomyia* in the same family as *Musca*, while *Phlebotomus*, although it undoubtedly belongs to a family (Psychodidæ) of which some species have densely scaled wings, has actually fewer scales on the wing than *Chaoborus*.† Nobody denies the affinity of *Corethra* and

* Mon. Culicidæ, iv., p. 15 (1907).

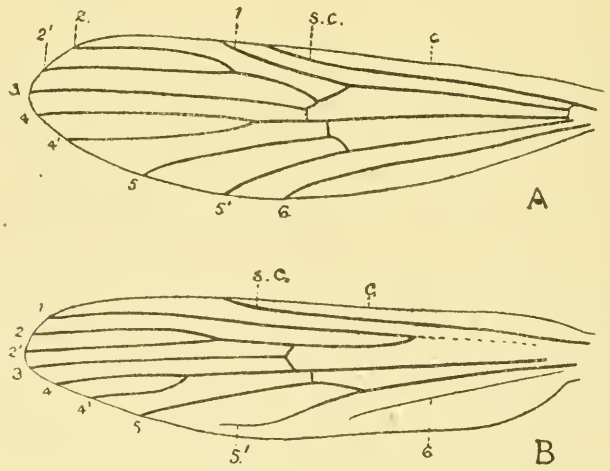
† As regards the synonymy of the genera allied to *Corethra*, see Brunetti, Rec. Ind. Mus., iv., p. 317 (1911).

Chaoborus, and even those authors who regard *Corethra* and its allies as constituting a separate family are forced to ignore the fact that *Pelorempis* has scales on its cross-veins, although they assign this genus also to the Corethridæ. *Ramcia* is eccentric enough to go further than *Pelorempis* in having at once a short proboscis, scales on the longitudinal veins (but not on the head or body), and a larva with several peculiar characters. I am not prepared to say whether those who have made a special study of the group would assign it to the Culicidæ (*sensu suo*) or the "Corethridæ." It differs from both groups in certain venation-characters, more especially as regards the position of the tip of the first longitudinal vein; but the larva on the whole resembles that of *Corethra*, and if the sub-family Corethrinæ is to be maintained, I would assign *Ramcia* to it.

I.—Description of the Adult Fly.

Ramcia,* gen. nov.

The venation is culiciform in general disposition, but is characterized by the fact that the first longitudinal vein, running almost parallel to the subcostal, reaches the costal border at some distance from the distal margin of the wing. The basal and marginal cells are elongate and narrow, and the cross-veins are situated near the centre of the wing.



Venation of the two Corethrinæ as yet known to occur in Ceylon:—A, *Ramcia inepta*, sp. nov. B, *Chaoborus asiaticus* (Giles), a species which occurs at Peradeniya.

c = costal border; *s. c.* = subcosta; 1 = first longitudinal; 2 = anterior branch of second longitudinal; 2′ = posterior branch of the same vein; 3 = third longitudinal or median vein; 4 = anterior branch of fourth longitudinal; 4′ = posterior branch of the same vein; 5 = anterior branch of fifth longitudinal; 5′ = posterior branch of the same vein; 6 = sixth longitudinal.

* Named, by special request of Major MacDougall, after the Royal Army Medical Corps.

The wing-margin (except the anterior proximal part) and the distal half of all the longitudinal veins are clothed with true scales, the proximal half of some of the longitudinal as well as the whole of the cross-veins bearing flattened hairs.

There are no scales on the head, body, or legs.

The eyes of the male as seen from the side consist of a transverse basal and a narrow vertical portion. The proboscis is short and feeble, much shorter than the palpi, which consist of four joints. The antennæ have fifteen joints, of which the first is minute, the second large and globular, and the remaining thirteen (the flagellum) almost cylindrical, but tapering slightly at the distal end, verticillate, and clothed with fine hairs.

The legs are moderately slender. They are clothed with stiff hairs and have simple, smooth-edged claws. The first tarsal joint is longer than the two succeeding joints together. The claws are smooth-edged and simple.

The male claspers are of simple structure.

The venation of this genus approaches that of the Psychodidæ as regards the position of the tip of the first longitudinal vein, but is of a less simple character.

Ramcia inepta, sp. nov.

The abdomen is dark in colour, the thorax paler but probably reticulated or mottled with some dark shade. The wings are pale, except for an interrupted dark crossbar which embraces the extremities of the subcostal and first longitudinal veins, includes the petioles of the first submarginal and the second posterior cells, and appears in the form of spots on the costal and posterior wing-fringes, the anterior branch of the fifth and the distal end of the sixth longitudinal vein, completely omitting the third longitudinal and the main stem of the fifth. The spot on the posterior margin is considerably in advance both of that on the anterior margin and of that on the sixth vein. The tips of all the tibiæ and the three distal joints of the tarsi of the first and second legs are dark.

The subcostal reaches the costal margin a little in front of the middle of the wing, and the tip of the first longitudinal is not much in advance of it. The second longitudinal vein is angulate at its junction with the third, and its fork is a little in advance of that of the fourth. The anterior cross-vein is extremely short. The anterior branch of the fifth longitudinal arises only a short distance behind the posterior cross-vein. There are no longitudinal incrassations or false veins, and the seventh longitudinal is entirely absent.

The wing is moderately narrow, bluntly rounded at the tip, its anterior border being nearly straight and its posterior border regularly and not very strongly curved.

Each joint of the flagellum of the antenna (of the male) bears a circle of very long stiff hairs at its base, and is clothed for the greater part of its length with shorter and softer hairs. The first joint of the flagellum bears also several additional circles of long stiff hairs. The first joint of the antenna is very small and inconspicuous, the second nearly half as large as the head. The third (*i.e.*, the first of the flagellum) is of moderate length and practically cylindrical. Joints 3 to 10 are subequal, joints 11 to 13 also subequal, but distinctly shorter than 3 to 10.

The fourth joint of the palpi (of the male) is the longest, the second the shortest, the first and third being subequal. The basal joint is clavate, the others cylindrical; all are clothed somewhat sparsely with slender hairs.

The legs are not very long; they are densely clothed with long straight hairs, among which shorter hairs are dispersed. The hind tibiæ are slightly incrassated at the tip. The femur and tibia of each leg are subequal, and in the first two pairs either joint is distinctly longer than the first tarsal joint, which in its turn is longer than the next three joints together. In the hind leg, however, which is longer than either of the other two, the tibia is only slightly longer than the first tarsal joint, which is shorter than the next three joints together. The claws are slender and strongly curved.

There is a small bunch of stiff slender hairs on the vertex just behind the eyes and another just in front of them. The thorax is sparsely clad with longer and stouter hairs, most of which curve backwards. The scutellum bears a very prominent bunch. The hairs on the abdomen, which are also scattered somewhat sparsely, are finer, more slender, and apparently softer.

The basal joint of the male claspers is cylindrical, about three times as long as broad and of about the same length as the distal joint, which is slender, not very strongly curved, narrowly blunt, and a little irregular at the tip. This joint is naked, but the basal joint is clothed in long hairs.

Length 2 mm.; length of wing 1·3 mm.

II.—Description of the Larva and Pupa.

The larva differs considerably from any that has previously been described, but bears a certain purely superficial resemblance to that of *Stegomyia*. Its most conspicuous features are its broad triangular head, minute eyes, long jaw-like antennæ, which arise close together in front of the head, and the distinct segmentation of the thorax. There are no palmate chætæ on any part of the animal. When fully adult it measures about 2·5 mm. in total length, its head measuring 0·53 mm. by 0·72 mm.

The head is flattened as well as broad, triangular in outline, pointed in front, but with the posterior lateral angles broadly

rounded. The antennæ arise close together at the anterior end, each on a small prominence. They are slender and somewhat depressed, each bearing at the tip three stout and rather lengthy chætæ. Pressed backwards in their natural attitude of repose their tips lie opposite the ocelli, which are dark, very minute, and circular in outline. They are situated on the dorsal surface near the lateral margin. There are no compound eyes. Fine sensory hairs are arranged as follows on the dorsal surface of the head : one on each side a short distance behind the base of each antenna, one just outside each eye, and a row of about five parallel to the lateral margin, a short distance in front of each eye. There is an S-shaped row of short, stout, simple chætæ on each side of the head, commencing on the dorsal surface a short distance behind the eye and curving down on to the ventral surface. Immediately posterior to the bases of the antennæ, on the middle line of the ventral surface, there is a bunch of slender pectinate chætæ which probably can be extended forwards, but in my specimens is folded backwards. The mandibles bear at the anterior end of their inner margin two stout rather blunt teeth, the outermost of which is the smaller of the two. Below these and on a different level six other teeth form an uninterrupted series, the first being the largest, the sixth the smallest, and the others subequal. Below the teeth there is a little T-shaped projection. The maxilla is rather slender and deeply notched on its free margin. The whole appendage is covered with minute chitinous projections. Two large chætæ are borne above the notch (the uppermost bearing a short subsidiary tooth on its upper margin) and two below it, the latter pair being very unequal in size. The lower lip is rather narrow, and the teeth on its anterior margin are slender, the central tooth being larger than any of the others, which are arranged approximately large and small alternately. There is a semi-circular row of stout simple bristles at the base of each maxilla, and at each side of the lower lip there are three sensory hairs, one situated near the end of the lip, the other two arising together some little distance posteriorly.

All the segments of the thorax are distinct and transverse. As seen from above, they have an irregularly hexagonal outline, and are produced to a point at each side, both the anterior and the posterior margins being sinuous, or (in the case of the posterior margin of the third segment) distinctly excavated in the middle. Each joint bears on the lateral point a bunch of long simple bristles.

The first segment of the abdomen, which consists of nine true segments, is broader than any of those of the thorax and more markedly produced at the sides, but otherwise resembles them. The succeeding joints are narrower and less distinctly hexagonal in dorsal profile. With the exception of the ninth, they bear a bunch of simple bristles at either side. The siphons are stout, of moderate length, and closely welded together ; apparently they lie almost in the same line as the abdomen. They are provided round their

free margin with several little organs, probably of a sensory nature and consisting of a minute chitinous structure shaped like a bird's mandible, from the base of which a slender chæta projects. A bunch of long simple bristles arises from the ventral surface of the tip of the abdomen below the base of the siphons. There are no "floats" or "fins."

In general structure the larva is not unlike that of *Corethra* (*Mochlonyx*) *velutina*, but the position of the antennæ is different, the head is much broader, the thoracic segments are not welded together, the abdomen is shorter and broader, the siphons are much stouter, and there are other differences.

The pupa of *Ramcia* is not so peculiar as the larva. The general shape is an elongate ovoid, and there is no very clear distinction in the outline between the thorax and the abdomen. The length is about 2 mm. and the greatest breadth about 0·7 mm. The breathing trumpets are long and slender. Their distal margin is distinctly emarginate dorsally, and there is a minute projection in the centre of the emargination. The antennæ curve round entirely outside the eyes. The wings extend to the ventral surface of the abdomen and nearly meet in the mid-ventral line. The abdominal segments decrease gradually in width from before backwards. The tergites are produced laterally in a triangular form, and their free margins are minutely denticulated. The anal lamellæ are slender and pointed; they also are minutely denticulated round the edge.

This pupa differs from that of most Culicidæ in not having the cephalo-thoracic mass distinctly separated from the abdomen. The respiratory trumpets differ from those both of *Culex* and of *Corethra*, but resemble the latter more nearly.

Unfortunately direct information as to the habits of the larva is not forthcoming, but light on this subject may be obtained by a study of the structure. The structure of the thorax indicates great freedom of movement, while that of the antennæ suggests that these organs are employed in seizing prey. There can, I think, be little doubt, therefore, that the larva is actively predacious. The points in which it differs anatomically from the larva of *Corethra* (*Mochlonyx*) *velutina* are not so great as those which distinguish the latter from the larvæ of *Chaoborus plumicornis* and *Ch. pallida*, and it is not too much to assume that in each genus the larval peculiarities are adaptive and due to differences in habits and environment rather than genetic divergence.

The swamp in which the original larvæ were taken has been drained, and neither Mr. Green nor Major MacDougall, both of whom have been kind enough to search for further specimens, have been able to obtain more. It is, however, desirable that dry specimens of the imago should be examined, if only to satisfy those entomologists who regard the superficial character of colour as the most important.